REMARKS

In accordance with the foregoing, claim 16 is amended. Claims 1 - 36 are pending. Claims 1 – 5 and 7 – 29 are currently under consideration, and claims 6 and 30 – 36 are withdrawn from consideration. No new matter is presented in this Amendment.

Rejection of claim 16 under 35 U.S.C. §112, second paragraph

At page 2 of the Office Action, claim 16 was rejected under 35 U.S.C. §112, second paragraph, as allegedly being indefinite. The Examiner alleged that there is insufficient antecedent basis for the limitation of "a central portion". For the following reasons, this rejection is respectfully traversed and reconsideration is requested.

Claim 16 is amended herein to depend from claim 14 instead of from claim 10. Claim 14 recites a central portion of the positive electrode, thereby providing an antecedent basis for the recitation of "a central portion" in claim 16. Therefore, the rejection should be withdrawn.

Rejection of claims 17 - 29 under 35 U.S.C. §112, second paragraph

At page 3 of the Office Action, claims 17 - 29 were rejected under 35 U.S.C. §112, second paragraph, as allegedly being indefinite. The Examiner alleged that the claims are drawn to a product and have methods of operating or using the product mixed in with the product claim. The Examiner alleged that a claim having both product limitations and method steps is indefinite. For the following reasons, this rejection is respectfully traversed and reconsideration is requested.

The Examiner is clearly in error in alleging that claims 17 – 29 are drawn to both a product and a method of operating or using a product. Claims 17 – 29 depend directly or indirectly from claim 14. Claim 14 depends from independent claim 10 and further defines the positive electrode of the lithium sulfur battery as having an average surface roughness Ra of approximately 0.1 to 15 μm in a central portion after a cycle life test of the battery is done. Therefore, claim 14 clearly defines a physical property of the positive electrode of the lithium sulfur battery, in specifying what the average surface roughness must be after a cycle life test. Claims 17 to 22 further define the cycle life test and therefore, further clarify the circumstances under which it is determined whether the positive electrode has the required average surface roughness. Therefore, these claims further define a physical property of the positive electrode, the average surface roughness. Claims 23 and 26 are directed to additional physical properties

of the lithium sulfur battery by specifying that the battery can be in a condition of being charged or being discharged after the cycle life test is done or by specifying a voltage that the battery must have after the cycle life test is done. Claims 27 – 29 further define a physical property of the lithium sulfur battery by specifying the area of the positive active material based on the total area of the positive electrode after the cycle life test is done. Therefore, claims 17 to 29 are clearly product claims further defining the lithium sulfur battery and are not indefinite.

Rejection of claims 1 – 5 and 7 – 29 under 35 U.S.C. §103(a)

Also page 3 of the Office Action, claims 1 - 5 and 7 - 29 were rejected under 35 U.S.C. §103(a) as being unpatentable over Grokovenko et al. (U.S. Patent No. 6,210,831) and further in view of Naruoka et al. (U.S. Patent Application Publication No.2002/0086210 A1). The Examiner alleged that Grokovenko et al. discloses a cathode with electroactive sulfur material in a battery and describes that the sulfur can be present as elemental sulfur. The Examiner acknowledged that Grokovenko et al. does not disclose the average particle size of the positive active material as being approximately 10 μm or less. The Examiner further alleged that Narouka et al. discloses a positive active material for a non-aqueous electrolyte secondary battery having a mean particle diameter of 4 μm to 25 μm. The Examiner took the position that it would have been obvious to use the same particle size of Narouka et al for the particle size of the positive electrode acrtive material of Grokovenko et al. on the alleged grounds that Narouka et al. teach that by using a lithium-nickel composite oxide having a mean particle diameter of from 4 μm to 25 μm, the capacity density can be kept high. Regarding claims 3 – 5, 7 – 9 12 – 15, 25 – 26 and 27 – 29, the Examiner took the position that the claimed properties are inherent in the positive electrode of Grokovenko et al. modified by Narouka et al. For the following reasons, this rejection is respectfully traversed and reconsideration is requested.

Independent claim 1 is directed to a positive electrode for a lithium sulfur battery comprising a positive active material with a particle size D (v, 50%) of approximately 10 μm or less, the positive active material being selected from the group consisting of elemental sulfur (S8), a sulfur-based compound, and a mixture thereof. Independent claim 10 is directed to a lithium sulfur battery that, among other features, comprises the positive active material having the particle size D (v, 50%) of approximately 10 μm or less and being selected from the group consisting of elemental sulfur (S8), a sulfur-based compound, and a mixture thereof. As acknowledged by the Examiner, Grokovenko et al. does not teach or suggest a positive active material of elemental sulfur or a sulfur-based compound having a particle size D (v, 50%) of

approximately 10 μm or less. Narouka et al., on the other hand, does not relate to a lithium sulfur battery at all, but rather describes a battery in which the positive active material is a lithium-nickel composite oxide. It is respectfully submitted that the Examiner has not provided any reason why a person skilled in the art would consider the description in Narouka et al. regarding particle sizes for a lithium-nickel composite oxide in a battery to be pertinent to the particular problems confronted with respect to a positive active material of elemental sulfur or a sulfur-containing material in a lithium sulfur battery. In particular, a person skilled in the art would understand that a lithium-nickel composite oxide such as described in Narouka et al. differs in its electrochemical mechanism and principles of operation from an elemental sulfur or sulfur based positive active material. Therefore, the description in Narouka et al. of a mean particle diameter of 4 μm to 25 μm for keeping a high capacity density of its lithium-nickel composite oxide particles would not lead a person skilled in the art to consider that there would be any advantages to modifying a positive active material of a lithium sulfur battery to provide elemental sulfur or a sulfur-based compound having a particle size D (v, 50%) of approximately 10 μm or less. Therefore, the rejection should be withdrawn.

Conclusion:

There being no further outstanding objections or rejections, it is submitted that the application is in condition for allowance. An early action to that effect is courteously solicited.

Finally, if there are any formal matters remaining after this response, the Examiner is requested to telephone the undersigned to attend to these matters.

If there are any additional fees associated with filing of this Amendment, please charge the same to our Deposit Account No. 503333.

Respectfully submitted,

STEIN, MCEWEN & BUI, LLP

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By: _____
Ralph T. Webb
Registration No. 33,047

1400 Eye St., NW
Suite 300
Washington, D.C. 20005
Telephone: (202) 216-9505
Facsimile: (202) 216-9510